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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/617,254	07/14/2000	Hiroshi Shinriki	194264US-2-DIV	9218

22850 7590 04/02/2004

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.  
1940 DUKE STREET  
ALEXANDRIA, VA 22314

EXAMINER
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PADGETT, MARIANNE L

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 04/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/017,254

Applicant(s)

Hiroshi Shinriki et al

Examiner

M.L. Palsett

Group Art Unit

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— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- ☒ Responsive to communication(s) filed on 7/26/02
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- ☒ Claim(s) 57-85 is/are pending in the application.
- Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- ☒ Claim(s) 57-85 is/are rejected.
- ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- ☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement

## Application Papers

- ☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☐ All ☐ Some\* ☐ None of the:
- ☐ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
- ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_
- ☐ Interview Summary, PTO-413
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Other \_\_\_\_\_

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1. As previously stated, use of relative terms lacking clear metes and bounds in the claims, or in a definitive definition provided in the original specification or in relevant cited prior art, is vague and indefinite, with claims 57, 62, 69 and 70, using "small", describing "a small quantity of N<sub>2</sub> gas..." or "...H<sub>2</sub> gas". While the cited support is found on p.38, which uses the term small, the metes and bounds of this relative term is not defined in the disclosure. Applicants cite p.63, line 10-14 for teaching "a small quantity of N<sub>2</sub> can be interpreted as meaning about 1 vol.% with respect to the oxygen gas". While p.63 does not use the term small, taken with applicant's statement on p.9 of the 7/26/02 response and the recited effect in the claims and specification, file wrapper estoppel for the meaning of the claimed "small" quantity is affected.

2. Claims 57-76 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 59 and 60, dependent from claim 58, neither "the plasma generating system" (in 59) nor "the UV radiating system" (in 60), have been positively chosen; hence effectively remain 1 of 3 options that may be used. This as written, it is unclear if the recited system is intended to be necessarily used, or if that limitation has merely been narrowed, if that option is chosen, but the others also remain.

In claim 61, "the excimer lamp" lacks any antecedent basis, and since NO UV rays are necessary employed any where in the limitations of independent claim 57, from which 61 depends, the claim also can not be properly examined over the prior art. Juxtaposition with claim 60, suggest that the dependence is wrong, but would still have a problem analogous to that of claims 59-60, where a further limited option needs to be positively claimed.

In the independent claims 57 and 69, it uncertain when the exciting step is applied to the process gas. Is it after it leaves the same generator, as implied, but not recommended by the listed sequence of steps, or is it in the O<sub>3</sub> generator? Either option can be considered to read on the claims as written,

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with the sequence implying intent of exciting *in situ* with the object, while no showing of support for combination of plasma separate from the O<sub>3</sub> generator and such disclosure as Fig. 25 described p.63-64<sup>+</sup> would suggest the latter, hence the intent is unclear.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 77-85 are rejected under 35 U.S.C. 103(a) as being unpatentable over The Japanese patent (JP 02-283,022) to Hiroshi Jinriki et al, in view of Usuki (5,914,151) or Hiramoto et al (5,510,158).

The Japanese patent as set forth in the English abstract was discussed in sections 8 and 9 of paper #5, mailed 4/20/02. A translation of the patent has been ordered, but not received at the time this action was written. As amended, the new claim 77 and its dependents differ from Jinriki et al by requiring use of an excimer lamp as opposed to the Hg lamp disclosed by Jinriki et al., and also, by not disclosing chamber pressures, whose obviousness was previously discuss.

It is noted that the generic category of excimer lamps covers lamps with wavelength output ranging all over the UV spectra, hence does not supply any critical difference from the lamp of Jinriki et

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al (022) that also emits in the UV range. However, claim 78 requires  $\lambda \leq 180$  nm for creating active oxygen from an O-source that may include O<sub>3</sub>. The US Patent to Usuki teaches the use of UV light (rays) in an oxygen containing atmosphere, such that ozone is produced in order to effect silica deposits, where preferred UV sources for use therein are alternatively taught as mercury vapor lamps with 185nm wavelengths or an excimer lamp with a wavelength of 172 nm. See the abstract; Col. 7, lines 54-Col.8, lines 19 and 40-65; and Col. 12, lines 15-39, esp. lines 30-34. Therefore, it would have been obvious to one of ordinary skill in the art that while Jinriki et al use a Hg lamp to treat the metal oxide of tantalum in a O<sub>3</sub> containing atmosphere, that a 172 nm excimer lamp (i.e. Xe<sub>2</sub> lamp) would have been equivalently effective, as the prior art has demonstrated the equivalence of these lamps in analogous oxidative environments for similar purposes of effecting oxide film quality and content.

Alternately, Hiramoto et al also teach use of UV light to create active oxygen for oxidative treatment environments or cleaning of substrate surfaces inclusive of metal oxides, where they are employing a dielectric barrier discharge lamp, which uses xenon gas, that forms an "excimer" molecule therein. See the abstract; Col. 1, lines 8-27; Col. 2, lines 30-67<sup>+</sup>; Col.3, lines 39-Col. 4, lines 9<sup>+</sup>. Hiramoto et al compare the use of this excimer lamp, with Hg lamps producing 185 nm for the same purposes, teaching that the dielectric barrier lamp is advantages over the mercury lamp, as it can produce a higher concentration of O<sub>3</sub>, thus may be employed without need for a separate ozonizer when such concentration desirable (Col.1, line 62-Col.2, line 26 and col.4, lines 3<sup>+</sup>). Thus, it would have been obvious to one of ordinary skill in the art to substitute the [excimer] Xe-lamp of Hiramoto for the Hg-lamp of Jinriki et al for the advantage taught therefore, especially as Jinriki et al is interested in employing relatively large concentration of O<sub>3</sub> for their process.

5. Other art of interest convening Xe<sub>2</sub> (172 nm) excimer lamps and O<sub>3</sub> includes Kizaki et al (7,763,892), and use of UV+O<sub>3</sub> in cleaning, etc...

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6. Claims 57-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jinriki et al (JP-2-283, 022), in view of JP1-298,003A or Harada et al (5,792,326).

Jinriki et al was previously discussed as noted above, and applicant's new claims differ from this reference by requiring use of a small quantity of  $N_2$  along with the  $O_2$  in the ozone generator. The English abstract of Jinriki et al only discusses chamber 118 as a heat-treating part independent from the  $O_3$  generator, and discusses performing its heat treatment of  $T \geq 400^\circ C$  or preferably  $700^\circ C$ , but Figure 7 which shows the described treatment chamber 118, lamp 104, show substrates residing therein on top of heaters 102 (oral translation), hence illustrating the claimed heating on a work table as such obvious techniques to employ therefore. Also, note that while how the  $O_3$  is generated, is not detailed in the abstract, use of plasmas, such as high frequency discharge, are old and well known as means for  $O_3$  generation, hence as such would have been obvious to employ therefore.

The Japanese Patent JP01-298,003A (translation ordered, not received for this action), as discussed by the English abstract indicates that use of trace amounts of  $N_2$  with high purity  $O_2$  is advantageous for employing in an  $O_3$  generating process, because it prevents the "time-wise lowering of the generated ozone concentration", hence as Jinriki et al desires to employ  $[O_3] \geq 5 \text{ vol.}\%$  in their process, and maintenance of concentrations of key reagents is old and well known to be important to achieving consistent and repeatable results, it would have been obvious to one of ordinary skill to employ trace, i.e. small amounts of  $N_2$  as claimed, in Jinriki et al's ozone generator, due to the advantages taught by JP 1-298,003.

Alternately, Harada et al (5,792,326) teaches  $O_2$  supplemented with  $N_2$  as a typical feed gas for ozone generators (Abstract; Col.1, lines 10-40, esp. 23-24; Col.3 lines 47-60; col.5, lines 1-2; Col.6, lines 52-67; Ex.2, Col. 7-9), such as used in Jinriki et al, and also for analogous purposes as in Ex.2 and Figure 7 for metal oxides. Therefore, it would have been obvious to one of ordinary skill in the art to employ the typical feed gas of  $O_2$  + traces of  $N_2$  (and taught filtering) in an ozone generator as required to be

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employed by Jinriki et al's process illustrated in their Fig.7, because it has been shown to be an effective and conventional gas for such purposes. Also note, Harada et al further supports the above asserted obviousness of using discharge plasmas (H.F.) as means for O<sub>3</sub> generation systems.

7. Claim 61 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jinriki et al, in view of JP1-298,003A or Harada et al as applied to claim 557 above, and further in view of Usuki or Hiramoto et al as discussed in section 4.

While as discussed above the excimer lamp of claim 61 is not clearly related to any process steps, the probable intent is for use as discussed above in section 4, hence the same motivational reasons for obviousness are again applied, assuming this intent.

8. Other art of interest to ozone processing include the JP reference to Ikeda (JP 61-39524) and Maeda et al (5,387,546), which employ UV, or Daniylchev (5,666,640) who employs microwaves.

9. Claims 57-76, particularly 58-59 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

As noted above, it is unclear when the claimed exciting is occurring (an ozonizer attached to a vessel is "on" it, as is an *in situ* plasma system), and where explicitly the support is to be found for possible meanings of the phasing, such as simultaneously using both an ozone generator and a separate H.F. or microwave plasma. Figure 1 and its description (p.16-17+) do not appear to employ any such *in situ* plasma. Fig. 25 (p.63<sup>+</sup>) does not appear to use an ozonizer. Applicant's 76 page jumbo specification, may contain appropriate discussion or clarification, however, if such is present, it was not found by the examiner & needs to be pointed out.

10. Applicants argue that Fujita et al, Sakiguchi et al and Sofia et al (presumably Soga et al), are not analogues because they are treating superconductors or relate to recording media, not modifying

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insulating metal oxides, however this argument is not convincing as all of these references are directed to metal oxides, whatever their end use, and applicant claims represented by the independent claims are directed to generic metal oxides, with no mention of them being required to be insulating or used therefore. On the other hand, while all three of these patents are employing plasmas to activate O-sources, such as O<sub>2</sub>, for treating metal oxides, they do not employ an ozonizer to supply their oxygen source, nor discuss if any O<sub>3</sub> is produced by their plasmas, although presence of some ozone in their O-plasma is virtually guaranteed, there would be no reason to use N<sub>2</sub> to optimize O<sub>3</sub> production, without additional reasons/ motivation to desire specifically the production for ozone for the processes.

11. Applicant's arguments with respect to claim 57-85 is have been considered but are moot in view of the new ground(s) of rejection.

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on Monday-Friday from about 8:30 am to 4:30 pm.



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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached at (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

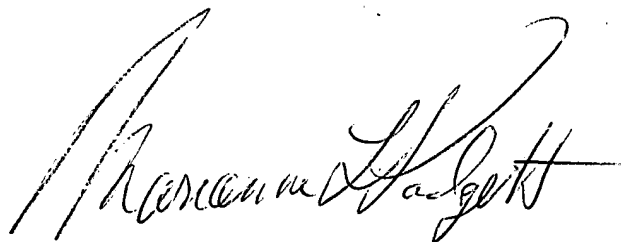
M. Padgett/lap

December 9, 2003

PS-sorry, the file appears to have been misplaced during our move.

Also, translations of JP01298003 & JP2-283,022 have now been received, are enclosed, but have not yet been reviewed by the examiner.

March 23, 2004

A handwritten signature in black ink, appearing to read "Marianne Padgett", with a large, sweeping flourish at the end.

**MARIANNE PADGETT  
PRIMARY EXAMINER**